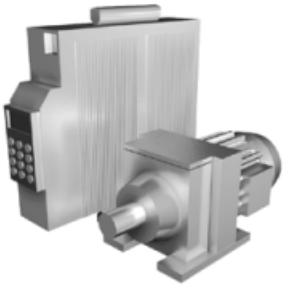
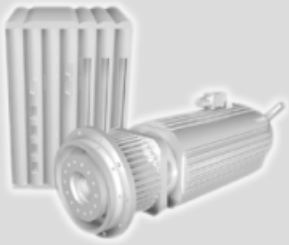
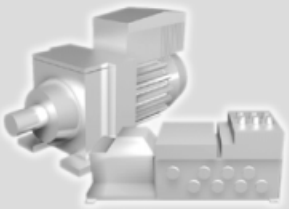
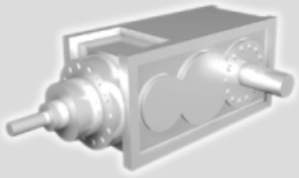
SEW EURODRIVE









MOVITRAC® B
FSC11B Communication Interface
FIO11B Analog Module

Edition 02/2007
11586613 / EN

Operating Instructions

SEW EURODRIVE

1 Important Notes 4
1.1 Structure of the safety notes 4
1.2 Right to claim under warranty 4
1.3 Exclusion of liability 4

2 Safety Notes 5
2.1 General information 5
2.2 Target group 5
2.3 Proper use 5
2.4 Transportation, storage 6
2.5 Installation 6
2.6 Electrical connection 6
2.7 Safe disconnection 7
2.8 Operation 7

3 Installation 8
3.1 FSC11B/FIO11B Installation 8

4 Startup 13
4.1 Startup with PC and MOVITOOLS® MotionStudio 13
4.2 Parameter list 14

5 Operation 23
5.1 Return codes (r-19 ... r-38) 23
5.2 Unit status codes 23

6 Service 24
6.1 Fault memory 24
6.2 Reset interface 24
6.3 Timeout active 24
6.4 List of errors (F-00 ... F-97) 25

7 Technical Data 28
7.1 Electronics data for FSC11B communication interface 28
7.2 FSC11B communication module 29

8 Index 30

1 Important Notes

1.1 Structure of the safety notes

The safety notes in these operating instructions are structured as follows:

Symbol	SIGNAL WORD
	Nature and source of hazard Possible consequence(s) if disregarded. • Measure(s) to avoid the hazard.

Symbol	Signal word	Meaning	Consequences if disregarded
Example: General hazard	**HAZARD**	Imminent danger	Severe or fatal injuries
	WARNING	Possible dangerous situation	Severe or fatal injuries
 Electric shock	**CAUTION**	Possible dangerous situation	Minor injuries
	STOP	Possible damage to property	Damage to the drive system or its environment
	NOTE	Useful information or tip Simplifies the operation of the drive system	

1.2 Right to claim under warranty

You must follow the information in the operating instructions to ensure trouble-free operation and for the fulfillment of any rights to claim under the limited warranty. Read the operating instructions before you start working with the unit.

Make sure that the operating instructions are available to persons responsible for the system and its operation, as well as to persons who work independently on the unit.

1.3 Exclusion of liability

You must comply with the information contained in these operating instructions to ensure safe operation of frequency inverters and to achieve the specified product characteristics and performance requirements. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, any liability for defects is excluded.

2 Safety Notes

The following basic safety notes are intended to avoid injury to persons and damage to property. The operator must make sure that the basic safety notes are read and observed. Make sure that persons responsible for the plant and its operation, as well as persons who work independently on the unit, have read through the operating instructions carefully and understood them. If you are unclear about any of the information in this documentation or if you require further information, please contact SEW-EURODRIVE.

2.1 General information

Never install or operate damaged products. In the event of damage, submit a complaint to the shipping company immediately.

During operation, drives with this type of enclosure may have live, uninsinuated, and sometimes moving or rotating parts as well as hot surfaces.

Removing covers without authorization, improper use as well as incorrect installation or operation may result in severe injuries to persons or damage to machinery.

Consult the documentation for additional information.

2.2 Target group

Only qualified personnel are authorized to transport, install, startup or service the units (observe IEC 60364 or CENELEC HD 384 or DIN VDE 0100 and IEC 60664 or DIN VDE 0110 as well as national accident prevention guidelines).

Qualified personnel in the context of these basic safety notes are persons familiar with installation, assembly, startup and operation of the product who possess the necessary qualifications.

All work in further areas of transportation, storage, operation and waste disposal must be carried out by persons who are trained appropriately.

2.3 Proper use

Frequency inverters are components intended for installation in electrical systems or machines.

In case of installation in machines, startup of the drive inverters (meaning the start of proper use) is prohibited until it is determined that the machine meets the requirements stipulated in the EC Directive 98/37/EC (machine directive); observe EN 60204.

Startup (i.e., the start of proper use) is only permitted under observance of the EMC (89/336/EEC) directive.

The frequency inverters comply with the requirements of the Low Voltage Directive 2006/95/EC. The harmonized standards of the EN 61800-5-1/DIN VDE T105 series in connection with EN 60439-1/VDE 0660 part 500 and EN 60146/VDE 0558 are applied to these frequency inverters.

Technical data and information on the connection requirements are provided on the nameplate and in the documentation; they must be strictly observed.

2.3.1 Safety functions

Frequency inverters from SEW-EURODRIVE cannot perform any safety functions unless the inverters are subordinate to higher-level safety systems. Use higher-level safety systems to ensure protection of equipment and personnel.

When using the "Safe stop" function, you must observe the following publications:

- MOVITRAC® B Safe Disconnection – Conditions
- MOVITRAC® B Safe Disconnection – Applications

2.4 Transportation, storage

You must observe the notes on transportation, storage and proper handling. Observe the climatic conditions as stated in the section "General technical data".

2.5 Installation

The units must be installed and cooled according to the regulations and specifications in the corresponding documentation.

Protect the frequency inverters from excessive strain. Especially during transportation and handling, do not allow the components to be deformed and/or insulation spaces altered. Avoid contact with electronic components and contacts.

Frequency inverters contain components that can easily be damaged by electrostatic energy and improper handling. Prevent mechanical damage or destruction of electric components (may pose health risk).

The following applications are prohibited unless the unit is explicitly designed for such use:

- Use in potentially explosive areas
- Use in areas containing harmful oils, acids, gases, vapors, dust, radiation, etc.
- Use in non-stationary applications which are subject to mechanical vibration and impact loads in excess of the requirements in EN 61800-5-1.

2.6 Electrical connection

Observe the applicable national accident prevention guidelines when working on live frequency inverters (for example, BGV A3).

Electrical installation must be carried out according to pertinent regulations (e.g., cable cross-sections, fusing, protective conductor connection). Additional information is contained in the documentation.

You will find notes on EMC compliant installation, such as shielding, grounding, arrangement of filters and routing of lines, in the documentation of the frequency inverters. Always observe these instructions, even for frequency inverters bearing the CE marking. The manufacturer of the system or machine is responsible for observing the limits established by EMC legislation.

Protective measures and protection devices must comply with the regulations in force (e.g. EN 60204 or EN 61800-5-1).

Required protective measures: The unit must be grounded.

2.7 Safe disconnection

The unit meets all requirements for safe disconnection of power and electronic connections in accordance with EN 61800-5-1. All connected circuits must also satisfy the requirements for safe disconnection.

2.8 Operation

Systems with integrated frequency inverters must be equipped with additional monitoring and protection devices, as applicable, according to the relevant safety guidelines and regulations, such as legislation governing technical equipment, accident prevention regulations, etc. Changes to frequency inverters using the operating software are permitted.

Do not touch live components or power connections immediately after disconnecting the frequency inverters from the supply voltage because there may still be some charged capacitors. Note the respective reference plates on the frequency inverter.

Keep all covers and doors closed during operation.

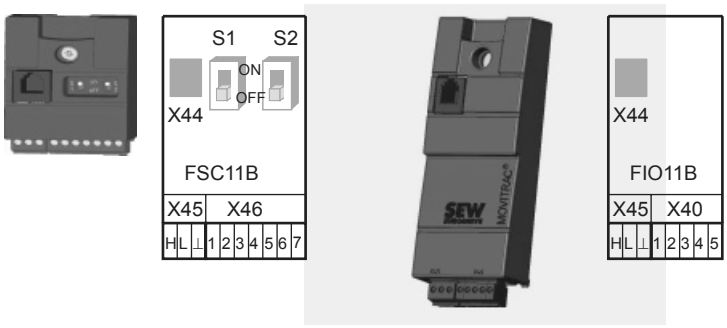
The fact that the status LED and other display elements are no longer illuminated does not indicate that the unit has been disconnected from the mains and no longer carries any voltage.

Mechanical blocking or safety functions inside the unit may result in the motor stopping. Removing the cause of the failure or performing a reset can cause the drive to restart automatically. If, for safety reasons, this is not permitted for the driven machine, disconnect the unit from the mains before beginning to correct the fault.

3 Installation

3.1 FSC11B/FIO11B Installation

You can enhance the basic units with the FSC11B and FIO11B modules.



Connection/Unit	FIO11B	FSC11B
RS-485 service interface X44	Yes	Yes
RS-485 terminal connection X45	Yes	Yes
Sbus connection X46	No	Yes
Analog input/output X40	Yes	No

3.1.1 Mounting and installation on FSC11B/FIO11B

Always attach the option to the unit with the screw that is included. For size 0, mount the spacer bolt first (the bolt is already mounted in sizes 1 and greater). Fitting the screw secures the high-frequency EMC connection between the basic unit and the option.

Function	Terminal	Description	Data	FSC11B	FIO11B
Service interface	X44	Via RJ10 plug connector	Only for service purposes Maximum cable length 3 m	Yes	Yes
RS-485 interface	X45:H	ST11: RS-485+		Yes	Yes
	X45:L	ST12: RS-485–			
	X45:⊥	GND: Reference potential			
System bus	X46:1	SC11: SBus high	CAN bus to CAN specification 2.0, parts A and B Max. 64 participants Terminating resistor 120 Ω can be activated via DIP switch	Yes	No
	X46:2	SC12: SBus low			
	X46:3	GND: Reference potential			
	X46:4	SC21: SBus high			
	X46:5	SC22: SBus low			
	X46:6	GND: Reference potential			
DC 24 V	X46:7	24VIO: Auxiliary voltage / external voltage supply		Yes	No
Analog input	X40:1	AI2: Voltage input	–10 ... +10 V R_i > 40 kΩ Resolution 10 bit Sampling time 5 ms	No	Yes
	X40:2	GND: Reference potential			

Function	Terminal	Description	Data	FSC11B	FIO11B
Analog output	X40:3	GND: Reference potential	0 ... +10 V I_{max} = 2 mA 0 (4) ... 20 mA Resolution 10 bit Sampling time 5 ms Short-circuit proof, protected against external voltage up to 30 V	No	Yes
	X40:4	AOV1: Voltage output			
	X40:5	AOI1: Current output			

The DC 24 V function of X46:7 is identical to X12:8 of the basic unit. All GND terminals of the unit are connected to each other.

Cable specification

- Use a 4-core twisted and shielded copper cable (data transmission cable with braided copper shield). The cable must meet the following specifications:
  - Core cross-section 0.25 ... 0.75 mm^2 (AWG 23 ... AWG 18)
  - Line resistance 120 Ω at 1 MHz
  - Capacitance per unit length ≤ 40 pF/m at 1 kHz

  Suitable cables include CAN bus or DeviceNet cables.

Shielding

- Connect the shield to the electronics shield clamp on the inverter or master controller and make sure it is connected over a wide area at both ends.
- There is no need for a ground connection for a connection between MOVITRAC® B and gateways or MOVITRAC® B and MOVITRAC® B with shielded cables. A 2-core cable is permitted in this case.
- When connecting MOVIDRIVE® B and MOVITRAC® B, always ensure that the electrical isolation between the reference potential DGND and ground is removed.

STOP

Potential displacement

Possible consequences include malfunctions that could lead to irreparable damage to the unit.

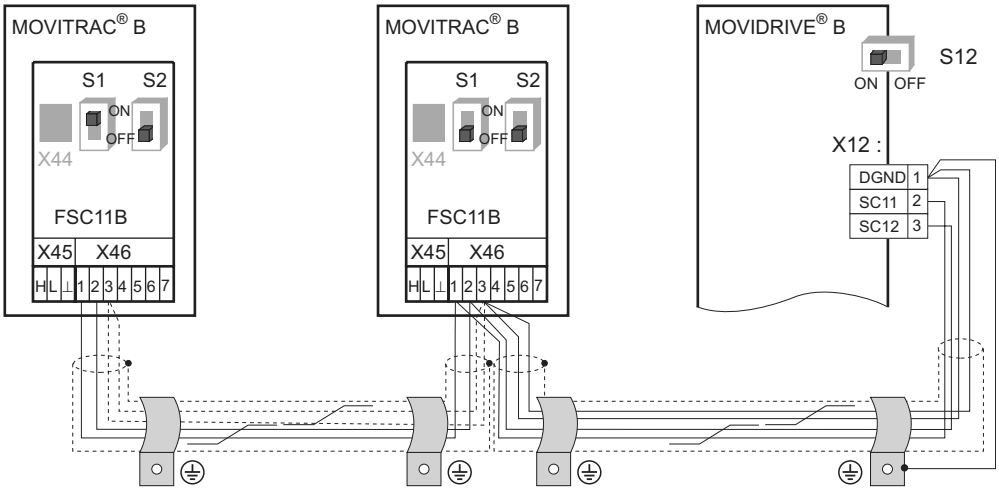
- There must not be any potential displacement between the connected units. Take appropriate measures to avoid potential displacement, such as connecting the unit ground connectors using a separate cable.

3.1.2 Installation: System bus (SBus) to FSC11B

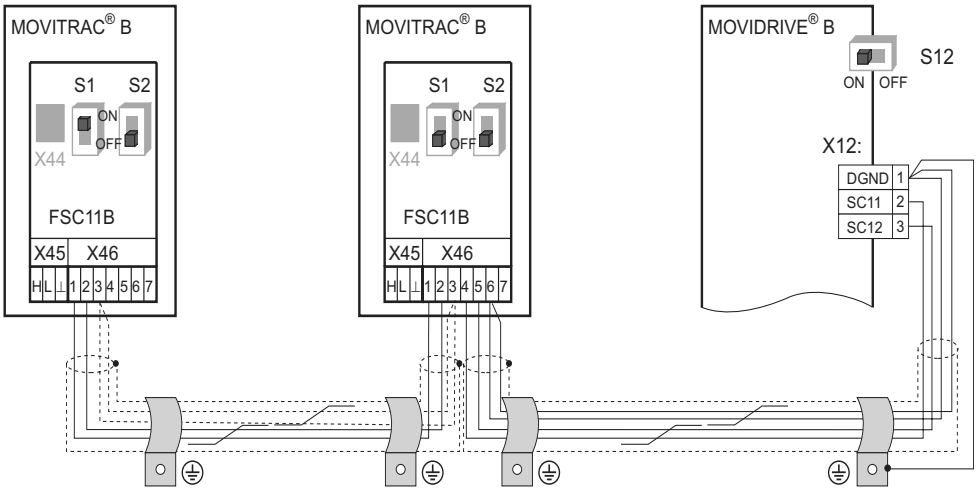
Max. 64 CAN bus participants can be addressed using the system bus (SBus). Use a repeater after 20 or 30 participants, depending on the length of the cables and the cable capacity. The SBus supports transmission technology compliant with ISO 11898.

S1	S2	SC11/SC12	SC21/SC22
Off	Off	CAN1	CAN1
On	Off	CAN1 concluded	–
X	On	Reserved	

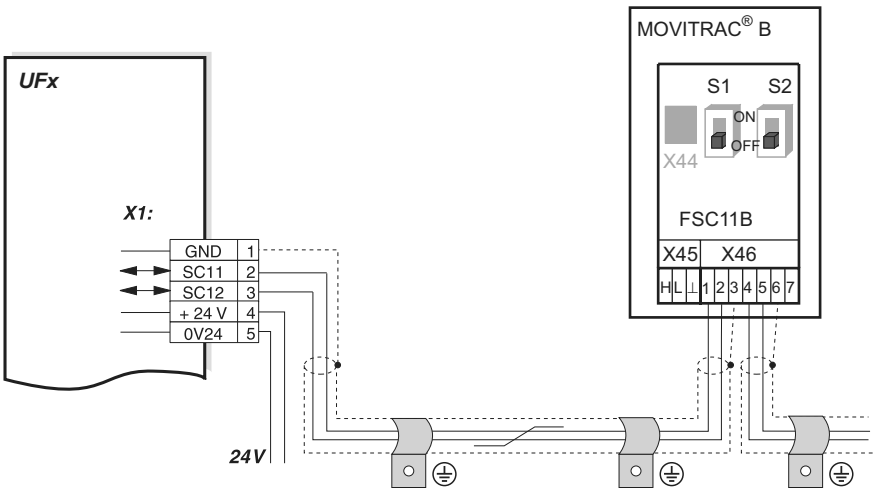
System bus connection MOVITRAC® B (same terminals)



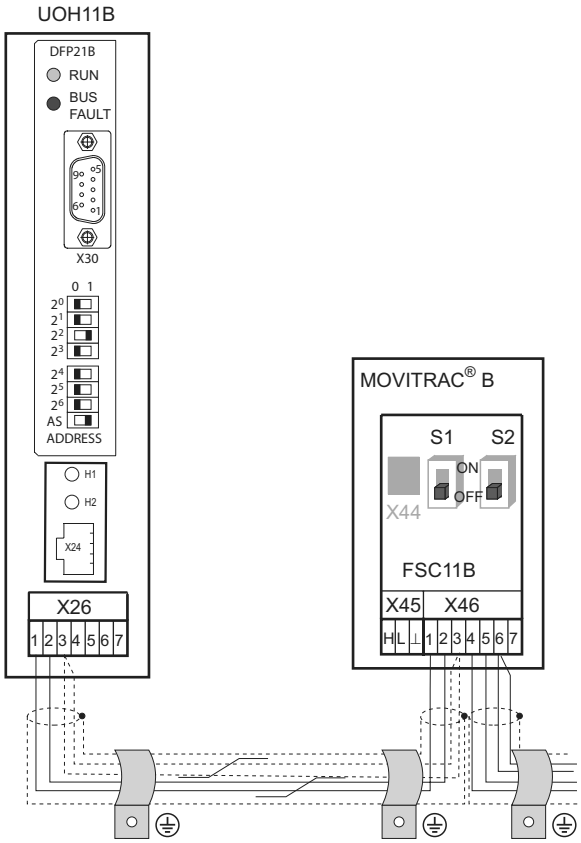
System bus connection MOVITRAC® B (different terminals)



System bus connection MOVITRAC® B with UFx



System bus connection MOVITRAC B with UOH11B



Cable length

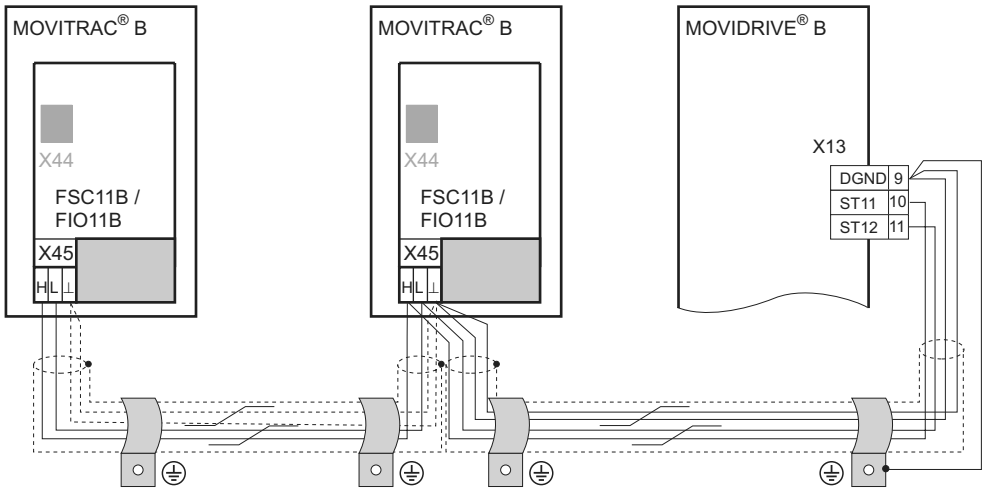
- The permitted total cable length depends on the baud rate setting of the SBus (P884):
  - 125 kBaud:320 m
  - 250 kBaud: 160 m
  - **500 kBaud: 80 m**
  - 1000 kBaud: 40 m
- You must use shielded cables.

	NOTE
	Terminating resistor: Switch on the system bus terminating resistor (S1 = ON) at the start and end of the system bus connection. Switch off the terminating resistor on the units in between (S1 = OFF). Certain units have a permanently integrated terminating resistor that cannot be switched off. This is the case for UFx and UOH/DFx gateways. These gateways form the end of the physical line. **Do not connect any external terminating resistors.**

3.1.3 Installation, RS-485 interface to FSC11B

The RS-485 interface can be used for connecting max. 32 MOVITRAC® units or 31 MOVITRAC® units and a higher-level controller (PLC).

RS-485 MOVITRAC® B connection

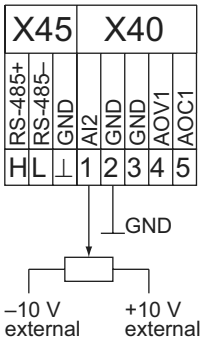
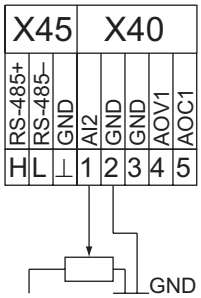
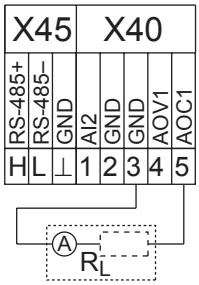
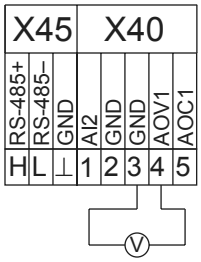


Cable length

- The permitted total cable length is 200 m.
- You must use shielded cables.

	NOTE
	Terminating resistor: Dynamic terminating resistors are installed. **Do not connect any external terminating resistors.**

3.1.4 Wiring the FIO11B analog module

Bipolar Analog Input AI2	Unipolar Analog Input AI2	Current Analog Output AOC1	Voltage Analog Output AOV1
			

$R_L \leq 750\ \Omega$

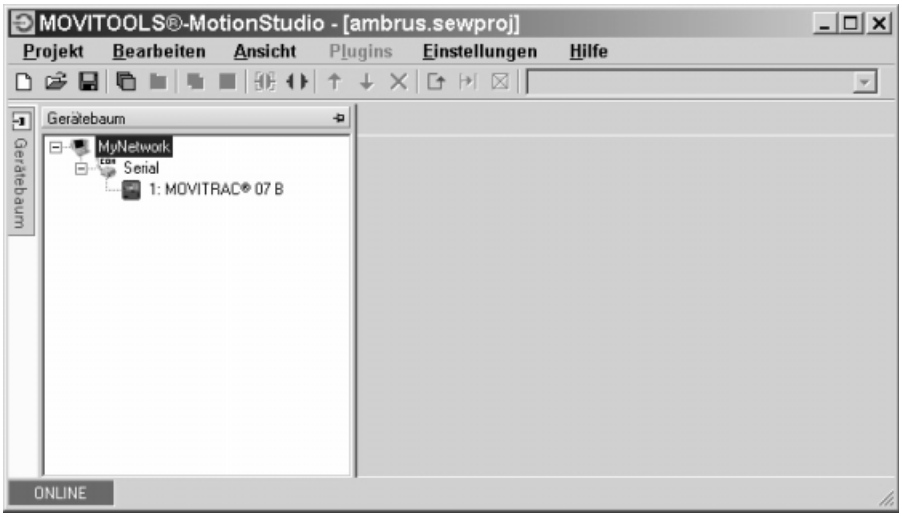
4 Startup

4.1 Startup with PC and MOVITOOLS® MotionStudio

Start MOVITOOLS® MotionStudio in the Windows start menu:

Programs / SEW / MOVITOOLS MotionStudio 5.x/MotionStudio 5.x

Press the MOVITOOLS® MotionStudio [Scan] button to list all connected units in the unit tree.



You can perform a startup by right-clicking on one of the units. You can find additional information in the online Help.

4.2 Parameter list

All parameters that can also be displayed and edited using the keypad are indicated as follows in the "FBG" (keypad) column:

Selection in long menu

Selection in short or long menu

Selection using symbols on keypad

Selection in the FBG motor startup

If a selection is offered, the factory setting is indicated in **bold**.

No.	FBG	Index dec.	Name	Range / Factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
0__			**Display values** (read only)			
00_			**Process values**			
000		8318	Speed (signed)		[rpm]	
002		8319	Frequency (signed)		[Hz]	
004		8321	Output current (amount)		[% I_{Rated}]	
005		8322	Active current (signed)		[% I_{Rated}]	
008		8325	DC link voltage		[V]	
009		8326	Output current		[A]	
01_			**Status displays**			
010		8310	Inverter status		[Text]	
011		8310	Operating status		[Text]	
012		8310	Fault status		[Text]	
013		8310	Current parameter set		Current parameter set	
014		8327	Heat sink temperature		[°C]	
02_			**Analog setpoints**			
020		8331	Analog input AI1		[V]	
021		8332	Analog input AI2 (optional)		[V]	
03_			**Binary inputs**			
030		8844	Binary input DI00		**Fault reset**	
031		8335	Binary input DI01		CW / STOP (fixed assignment)	
032		8336	Binary input DI02		**CCW / STOP**	
033		8337	Binary input DI03		**Enable / stop**	
034		8338	Binary input DI04		**n11 / n21**	
035		8339	Binary input DI05		**n12 / n22**	

No.	FBG	Index dec.	Name	Range / Factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
039	Lon6	8334	Binary inputs DI00 ... DI05		Binary display	
05_			**Binary outputs**			
051		8349	Binary output DO01		**/Fault**	
052		8349	Binary output DO02		**Brake released**	
053		8349	Binary output DO03		**Ready for operation**	
059	Lon6	8349	Binary outputs DO01 ... DO03		Binary display	
07_			**Unit data**			
070		8301	Unit type		[Text]	
071		8361	Rated output current		[A]	
076		8300	Firmware basic unit		[Part number and version]	
077		–	DBG firmware		Only in DBG60B	
08_			**Fault memory**			
080 ... 084	Lon6	8366 ... 8370	Fault t-0 ... t-4	Fault code	Background information for previous faults.	
09_			**Bus diagnostics**			
094	Lon6	8455	PO1 setpoint		[hex]	
095	Lon6	8456	PO2 setpoint		[hex]	
096	Lon6	8457	PO3 setpoint		[hex]	
097		8458	PI1 actual value		[hex]	
098		8459	PI2 actual value		[hex]	
099		8460	PI3 actual value		[hex]	
1__			**Setpoints / Integrators** (on FBG only parameter set 1)			
10_			**Setpoint selection / Frequency input**			
100	Short	8461	Setpoint source	0 **1** 2 4 6 7 10 11 14	Bipolar / Fixed setpoint **Unipolar / Fixed setpoint** RS 485 / Fixed setpoint Motor potentiometer / Fixed setpoint Fixed setpoint + AI1 Fixed setpoint * AI1 SBus 1 / Fixed setpoint Frequency setpoint input / Fixed setpoint Bipolar AI2 / Fixed setpoint	
101	Short	8462	Control signal source	**0** 1 3 4	**Terminals** RS-485 SBus 1 3 wire control	
102	Lon6	8840	Frequency scaling	0.1 ... **10** ... 120.00 [kHz]		
103	Lon6	10247.15	FI1 reference	**0** 1	**n_{max}** n_{ref}	

No.	FBG	Index dec.	Name	Range / Factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
104	Lon6	10247.10	Setpoint reference speed $n_{ref.}$	0 ... **3000** ... 6000 rpm		
105	Lon6	10416.1	Open circuit detection	0 2 4 **7**	No response Immediate stop / fault Rapid stop / fault **Rapid stop / warning**	
106	Lon6	10247.11	FI1 characteristic curve x1	**0** ... 100 %		
107	Lon6	10247.12	FI1 characteristic curve y1	–100 % ... **0** ... +100 %		
108	Lon6	10247.13	FI1 characteristic curve x2	0 ... **100 %**		
109	Lon6	10247.14	FI1 characteristic curve y2	–100 % ... 0 ... **+100 %**		
11_			**Analog input 1 (0 ... 10 V)**			
110	Short	8463	AI1 scaling	0.1 ... **1** ... 10		
112	Short	8465	AI1 Operating mode	**1** 5 6 7 8 9	**10 V, reference maximum speed** 0 – 20 mA, reference maximum speed 4 – 20 mA, reference maximum speed 0 – 10 V, n-reference 0 – 20 mA, n-reference 4 – 20 mA, n-reference	
113	Lon6	8466	AI1 voltage offset	–10 V ... **0** ... +10 V		
116	Short	10247.6	AI1 characteristic curve x1	**0** ... 100 %		
117	Short	10247.7	AI1 characteristic curve y1	–100 % ... **0** ... +100 %		
118	Short	10247.8	AI1 characteristic curve x2	0 ... **100 %**		
119	Short	10247.9	AI1 characteristic curve y2	–100 % ... 0 ... **+100 %**		
12_			**Analog input AI2 / FBG setpoint control module (option)**			
120	Lon6	8469	AI2 operating mode	**0** 1 2	**No function** 0 ... ±10 V + Setpoint 0 ... 10 V current limitation	
121	Short	8811	Addition FBG setpoint control module	**0** 1 2	**Off** On On (without fixed setpoint)	
122	Short	8799	Direction of rotation FBG manual operation	**0** 1 2	**Unipolar CW** Unipolar CCW Bipolar CW and CCW	
126	Lon6	10247.1	AI2 characteristic curve x1	–100 % ... **0** ... +100% (–10 V ... **0** ... +10 V)		
127	Lon6	10247.2	AI2 characteristic curve y1	–100 % ... **0** ... +100% ($-n_{max}$ ... **0** ... $+n_{max}$ / **0** ... I_{max})		
128	Lon6	10247.3	AI2 characteristic curve x2	–100 % ... 0 ... **+100%** (–10 V ... 0 ... +**10 V)**		
129	Lon6	10247.4	AI2 characteristic curve y2	–100 % ... 0 ... **+100%** ($-n_{max}$ ... 0 ... +$\mathbf{n_{max}}$ / 0 ... $\mathbf{I_{max}}$)		

No.	FBG	Index dec.	Name	Range / Factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
13_ / 14_			**Speed ramps 1 / 2**			
130 / 140		8807 / 9264	Ramp t11 / t21 up	0.1 ... **2** ... 2000 [s]		
131 / 141		8808 / 9265	Ramp t11 / t21 down	0.1 ... **2** ... 2000 [s]		
136 / 146		8476 / 8484	Stop ramp t13 / t23	0.1 ... **2** ... 20 [s]		
15_			**Motor potentiometer function**			
150		8809	Ramp t3 up = down	0.2 ... **20** ... 50 [s]		
152		8488	Save last setpoint	**Off** On	**Off** On	
16_ / 17_			**Fixed setpoints**			
160 / 170		8489 / 8492	Internal setpoint n11 / n21	0 ... **150** ... 5000 [rpm]		
161 / 171		8490 / 8493	Internal setpoint n12 / n22	0 ... **750** ... 5000 [rpm]		
162 / 172		8491 / 8494	Internal setpoint n13 / n23	0 ... **1500** ... 5000 [rpm]		
163 / 173		8814 / 8817	n11 / n21 PI controller	0 ... **3** ... 100 [%]		
164 / 174		8815 / 8818	n12 / n22 PI controller	0 ... **15** ... 100 [%]		
165 / 175		8816 / 8819	n13 / n23 PI controller	0 ... **30** ... 100 [%]		
2__			**Controller parameters**			
25_			**PI controller**			
250		8800	PI controller	**0** 1 2	**Off** Normal Inverted	
251		8801	P-gain	0 ... **1** ... 64		
252		8802	I-component	0 ... **1** ... 2000 [s]		
253		8465	PI actual value mode	**1** 5 6 7 8 9	**10 V, reference maximum speed** 0 – 20 mA, reference maximum speed 4 – 20 mA, reference maximum speed 0 – 10 V, n-reference 0 – 20 mA, n-reference 4 – 20 mA, n-reference	
254		8463	PI actual value scaling	0.1 ... **1.0** ... 10.0		
255		8812	PI actual value offset	**0.0** ... 100.0 [%]		

No.	FBG	Index dec.	Name	Range / Factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
3__			**Motor parameters** (on FBG only parameter set 1)			
30_ / 31_			**Limits 1 / 2**			
300 / 310		8515 / 8519	Start/stop speed 1 / 2	0 ... **150** [rpm]		
301 / 311		8516 / 8520	Minimum speed 1 / 2	0 ... **15** ... 5500 [rpm]		
302 / 312		8517 / 8521	Maximum speed 1 / 2	0 ... **1500** ... 5500 [rpm]		
303 / 313		8518 / 8522	Current limit 1 / 2	0 ... **150** [% I_{Rated}]		
32_ / 33_			**Motor adjustment 1 / 2**			
320 / 330		8523 / 8528	Automatic adjustment 1 / 2	Off **On**	Off **On**	
321 / 331		8524 / 8529	Boost 1 / 2	0 ... 100 [%]		
322 / 332		8525 / 8530	IxR Compensation 1 / 2	0 ... 100 [%]		
323 / 333		8526 / 8531	Pre-magnetization time 1 / 2	0 ... 2 [s]		
324 / 334		8527 / 8532	Slip compensation 1 / 2	0 ... 500 [rpm]		
325		8834	No-load damping	**Off** On	**Off** On	
34_			**I_{Rated} UL monitoring**			
345 / 346		9114 / 9115	I_{Rated} UL monitoring 1 / 2	0.1 ... 500 A		
4__			**Reference messages**			
40_			**Speed reference message**			
400		8539	Speed reference value	0 ... **750** ... 5000 [rpm]		
401		8540	Hysteresis	0 ... **100** ... +500 [rpm]		
402		8541	Delay time	0 ... **1** ... 9 [s]		
403		8542	Message = "1" if:	**0** 1	**n < n_{ref}** n > n_{ref}	
45_			**PI controller reference message**			
450		8813	PI actual value reference			
451		8796	Message = "1" if:	0 **1**	PI Actual value < PI ref **PI Actual value > PI ref**	
5__			**Monitoring functions** (on FBG only parameter set 1)			
50_			**Speed monitoring 1 / 2**			
500 / 502		8557 / 8559	Speed monitoring 1 / 2	**0** 3	**Off** Motor / regenerative	
501 / 503		8558 / 8560	Delay time 1 / 2	0 ... **1** ... 10 [s]		

No.	FBG	Index dec.	Name	Range / Factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
6__			**Terminal assignment**			
60_			**Binary inputs**			
601	Short	8336	Binary input DI02 assignment		0: No function 1: Enable / stop (factory setting DI03) 2: CW / stop 3: CCW / stop (factory settingDI02) 4: n11 / n21 (factory setting DI04) 5: n12 / n22 (factory setting DI05) n13 = n11 + n12 6: Fixed setpoint switchover 7: Parameter set switchover 9: Motor potentiometer up 10: Motor potentiometer down 11: /External fault 12: Fault reset (factory setting DI00) 20: Setpoint acceptance active 26: TF message (only with DI05) 30: Controller inhibit	
602	Short	8337	Binary input DI03 assignment			
603	Short	8338	Binary input DI04 assignment			
604	Short	8339	Binary input DI05 assignment			
608	Short	8844	Binary input DI00 assignment			
62_			**Binary outputs**			
620	Short	8350	Binary output DO01 assignment		0: No function 1: /Fault (factory setting DO01) 2: Ready (factory setting DO03) 3: Output stage on 4: Rotating field on 5: Brake released (factory setting DO02 / not with DO03) 7: Parameter set 9: Speed reference message 11: Comparison message setpoint-actual value 21: IPOS output 22: /IPOS fault 23: PI controller actual value reference 24: Ex-e current limit active (in preparation)	
621	Short	8351	Binary output DO02 assignment			
622	Short	8916	Binary output DO03 assignment			
64_			**Analog outputs AO1** (optional)			
640	Lon6	8568	Analog output AO1	**0** 1 2 3 4 5 6 7 11 12	**No function** Ramp generator input Setpoint speed Actual speed Actual frequency Output current Active current Unit utilization Actual speed (signed) Actual frequency (signed)	
641	Lon6	10248.5	AO1 reference	**0** 1 2	**3000 rpm , 100 Hz, 150%** n_{max} $n_{set\ ref.}$	
642	Lon6	8570	Operating mode AO1	**0** 2 3 4	**No function** 0 ... 20 mA 4 ... 20 mA 0 ... 10 V	
646	Lon6	10246.1	AO1 Characteristic curve x1	–100 % ... **0** ... +100 %		
647	Lon6	10246.2	AO1 Characteristic curve y1	**0** ... 100 %		

No.	FBG	Index dec.	Name	Range / Factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
648	Lon6	10246.3	AO1 Characteristic curve x2	–100 % ... 0 ... **+100 %**		
649	Lon6	10246.4	AO1 Characteristic curve y2	0 ... **100 %**		
7__			**Control functions** (on FBG only parameter set 1)			
70_			**Operating modes 1 / 2**			
700 / 701		8574 / 8575	Operating mode 1 / 2	0 2 3 4 **21** 22	VFC VFC & hoist VFC & DC braking VFC & flying start function **V/f characteristic curve** V/f & DC braking	
71_			**Standstill current 1 / 2**			
710 / 711	Lon6	8576 / 8577	Standstill current 1 / 2	**0** ... 50% I_{Mot}		
72_			**Setpoint stop function 1 / 2**			
720 / 723	Lon6	8578 / 8581	Setpoint stop function 1 / 2	**Off** On	**Off** On	
721 / 724	Lon6	8579 / 8582	Stop setpoint 1 / 2	0 ... **30** ... 500 [rpm]		
722 / 725	Lon6	8580 / 8583	Start offset 1 / 2	0 ... **30** ... 500 [rpm]		
73_			**Brake function 1 / 2**			
731 / 734	Lon6	8749 / 8750	Brake release time 1 / 2	**0** ... 2 [s]		
732 / 735	Lon6	8585 / 8587	Brake application time 1 / 2	0 ... 2 [s]		
74_			**Speed skip function**			
740 / 742	Lon6	8588 / 8590	Skip window center 1 / 2	0 ... **1500** ... 5000 rpm		
741 / 743	Lon6	8589 / 8591	Skip width 1 / 2	**0** ... 300 rpm		
76_			**Manual operation**			
760	Lon6	8798	Lock RUN / STOP keys	**Off** On	**Off** On	
77_			**Energy-saving function**			
770	Lon6	8925	Energy-saving function	**Off** On	**Off** On	
8__			**Unit functions** (on FBG only parameter set 1)			
80_			**Setup**			
800	Short	–	Short menu	Long **Short**		
802	Lon6	8594	Factory setting	**No** Std ALL 4	**0 / No** 1 / Standard 2 / Delivery status 4 / NEMA delivery status	
803	Lon6	8595	Parameter lock	**Off** On	**Off** On	
804		8596	Reset statistical data		**No action** Fault memory	

No.	FBG	Index dec.	Name	Range / Factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
806		–	Copy DBG → MOVITRAC® B		Yes **No**	
807		–	Copy MOVI-TRAC® B → DBG		Yes **No**	
81_			**Serial communication**			
810	Lon6	8597	RS-485 address	**0** ... 99		
811		8598	RS-485 group address	**100** ... 199		
812		8599	RS-485 timeout delay	**0** ... 650 [s]		
82_			**Brake operation 1 / 2**			
820 / 821		8607 / 8608	4-quadrant operation 1 / 2	Off **On**	Off **On**	
83_			**Fault responses**			
830	Lon6	8609	Response terminal "external fault"	2 **4** **7**	Immediate stop / fault **Rapid stop / fault** (830) **Rapid stop / warning** (833 / 836)	
833	Lon6	8612	Response timeout RS-485			
836	Lon6	8615	Response timeout SBus			
84_			**Reset behavior**			
840		8617	Manual reset		Yes **No**	
86_			**Modulation 1 / 2**			
860 / 861	Lon6	8620 / 8621	PWM frequency 1 / 2	**4** 8 12 16	**4 kHz** 8 kHz 12 kHz 16 kHz	
862 / 863	Lon6	8751 / 8752	PWM fix 1 / 2	On **Off**	On **Off**	
87_			**Process data parameter setting**			
870	Lon6	8304	Setpoint description PO1		**No function** (factory setting P872) **Set speed** (factory setting P871) Max. speed Ramp **Control word 1** (factory setting P870) Control word 2 Set speed [%] IPOS PO data PI controller setpoint [%]	
871	Lon6	8305	Setpoint description PO2			
872	Lon6	8306	Setpoint description PO3			
873	Lon6	8307	Actual value description PI1		No function **Actual speed** (factory setting P874) **Output current** (factory setting P875) Active current **Status word 1** (factory setting P873) Actual speed [%] IPOS PI-DATA PI controller actual value [%]	
874	Lon6	8308	Actual value description PI2			
875	Lon6	8309	Actual value description PI3			
876	Lon6	8622	PO data enable		No **Yes**	

No.	FBG	Index dec.	Name	Range / Factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
88_			**Serial communication SBus**			
880	LonB	8937	SBus protocol	**0 / MoviLink** 1 / CANopen		
881	Short	8600	SBus address	**0** ... 63		
882		8601	SBus group address	**0** ... 63		
883	LonB	8602	SBus timeout delay	**0** ... 650 [s]		
884	LonB	8603	SBus baud rate	125 250 **500** 1000	125 kBaud 250 kBaud **500 kBaud** 1 mBaud	
886	LonB	8989	CANopen address	1 ... **2** ... 127		

5 Operation

5.1 Return codes (r-19 ... r-38)

Return codes MOVITRAC® B:

No.	Description	Meaning
19	Parameter lock activated	Parameters cannot be changed
20	Factory setting in progress	Parameters cannot be changed
23	Option card missing.	The required option card for the function is missing.
27	Option card missing.	The required option card for the function is missing.
28	Controller inhibit required	Controller inhibit required
29	Invalid value for parameter.	• Invalid value for parameter. • FBG manual operation selection invalid as PC is in active manual operation.
32	Enable	You cannot perform this function in ENABLED status
34	Fault in sequence	• Fault when saving in FBG11B. • Startup did not occur with FBG. Perform FBG startup with MotionStudio or select a new motor.
38	FBG11B incorrect data set	Stored data set does not match the unit

5.2 Unit status codes

Use status word 1 to determine the unit status code.

Code	Meaning
0x0	Not ready
0x1	Controller inhibit
0x2	No enable
0x3	Standstill current active, no enable
0x4	Enable
0x8	Factory setting is active

6 Service

6.1 Fault memory

The inverter saves the fault message in fault memory P080. The inverter only saves a new fault after the fault message has been acknowledged. The local operating panel shows the most recent fault. Whenever double faults occur, the value stored in P080 does not correspond to the value displayed on the operating panel. This is an example of what happens with F-07 DC link overvoltage followed by F34 ramp timeout.

The inverter stores the following information when a fault occurs:

- Fault occurred
- Status of the binary inputs / binary outputs
- Operating status of the inverter
- Inverter status
- Heat sink temperature
- Speed
- Output current
- Active current
- Unit utilization
- DC link voltage

6.2 Reset interface

A fault message can be acknowledged by:

- Manual reset in MOVITOOLS® (*P840 Manual reset* = *YES* or in status window of reset button).

6.3 Timeout active

If the inverter is controlled via a communication interface (RS-485 or SBus) and the mains power was switched off and back on again, the enable remains ineffective until the inverter once again receives valid data via the interface, which is monitored with a timeout.

6.4 List of errors (F-00 ... F-97)

No.	Designation	Response	Possible cause	Measure
00	No error			
01	Over-current	Immediate switch-off with inhibit	• Short circuit output • Output switching • Motor too large • Faulty output stage	• Rectify the short circuit • Switching with inhibited output stage only • Connect a smaller motor • Consult SEW Service if the error still cannot be reset
03	Ground fault	Immediate switch-off with inhibit	• Ground fault in motor • Ground fault in inverter • Ground fault in the motor supply lead • Overcurrent (see F-01)	• Replace motor • Replace MOVITRAC® B • Eliminate ground fault • See F-01
04	Brake chopper	Immediate switch-off with inhibit	• Too much regenerative power • Braking resistor circuit interrupted • Short circuit in the braking resistor circuit • Brake resistor has too high resistance • Brake chopper defective • Ground fault	• Extend deceleration ramps • Check supply cable to the braking resistor • Rectify the short circuit • Check technical data of braking resistor • Replace MOVITRAC® B • Eliminate ground fault
06	Phase failure in supply system (only applies to 3-phase inverter)	Immediate switch-off with inhibit	• Phase failure • Supply voltage too low	• Check the supply system lead • Check the supply voltage
07	DC link over-voltage	Immediate switch-off with inhibit	• DC link voltage too high • Ground fault	• Extend deceleration ramps • Check supply cable to the braking resistor • Check technical data of braking resistor • Eliminate ground fault
08	Speed monitoring	Immediate switch-off with inhibit	Current controller works at the set limit due to: • Mechanical overload • Phase failure in supply system • Phase failure in motor Maximum speed for VFC operating modes exceeded	• Reduce load • Increase deceleration time setting P501 • Check current limitation • Extend deceleration ramps • Check mains phases • Check motor cable and motor • Reduce maximum speed
9	Startup error	Immediate switch-off with inhibit	• Inverter not started yet • Unknown motor selected	• Start up the inverter • Select another motor
10	ILLOP	Stop with inhibit	• Wrong command during command execution • Incorrect conditions during command execution. • Function does not exist / is not implemented in the inverter	• Check the program • Check program run • Use another function
11	Overtemperature	Stop with inhibit	Thermal overload of inverter	• Reduce load and / or ensure adequate cooling • If a braking resistor is integrated in the heat sink: Install braking resistor externally
17-24	System error	Immediate switch-off with inhibit	Malfunction of inverter electronics, possibly due to EMC influence	Check grounding and shielding and improve, if necessary. Contact SEW Service for advice if this reoccurs.

No.	Designation	Response	Possible cause	Measure
25	EEPROM	Stop with inhibit	Error when accessing EEPROM	Activate factory settings, perform reset and reset parameters. Contact SEW Service for advice if this error reoccurs.
26	External terminal	program-mable	Read external error signal via pro-grammable input	Eliminate specific cause of error; reprogram terminal if necessary.
31	TF trip	Stop with inhibit	• Motor too hot, TF sensor has tripped • TF sensor of motor not connected or connected incorrectly • Connection of MOVITRAC® B and TF on motor interrupted	• Let motor cool off and reset error • Check connections/links between MOVITRAC® B and TF.
32	Index overflow	Emergency stop	Programming principles violated which leads to system-internal stack over-flow.	Check user program and correct it
34	Ramp timeout	Immediate switch-off with inhibit	• Set ramp time exceeded. • If you remove the inhibit and the drive exceeds the stop ramp time t13 by a certain time, the inverter will signal F34.	• Extend the ramp time • Extend the stop ramp time
36	Option missing	Immediate switch-off with inhibit	• Type of option card not allowed • Setpoint source, control signal source or operating mode not permitted for this option card	• Use correct option card • Set correct setpoint source • Set correct control signal source • Set the correct operating mode
37	Watchdog timer	Immediate switch-off with inhibit	Error in system software sequence	Check grounding and shielding and improve, if necessary. Contact SEW Service for advice if this reoccurs.
38	System soft-ware	Immediate switch-off with inhibit	System error	Check grounding and shielding and improve, if necessary. Contact SEW Service for advice if this reoccurs.
43	RS-485 timeout	Stop without inhibit[1)]	Connection between inverter and PC interrupted.	Check connection between inverter and PC.
44	Unit utilization	Immediate switch-off with inhibit	Unit utilization (Ixt value) exceeded	• Decrease power output • Extend ramps • If these points are not possible: Use a larger inverter
45	Initialization	Immediate switch-off with inhibit	Error during initialization	Contact SEW Service for advice.
46	System bus 2 timeout	Stop without inhibit	Error during communication via system bus	Check system bus connection
47	System bus 1 timeout	Stop without inhibit	Error during communication via system bus	Check system bus connection
77	Control word	–	System error	Contact SEW Service.
81	Start condition	Immediate switch-off with inhibit	**Only in "VFC hoist" operating mode:** The motor could not be supplied with the correct amount of current during the pre-magnetizing time: • Rated motor power too small in relation to rated inverter power. • Motor cable cross-section too small	• Check connection between inverter and motor • Check startup data and perform new startup, if necessary. • Check cross-section of motor cable and increase if necessary.
82	Open output	Immediate switch-off with inhibit	**Only in "VFC hoist" operating mode:** • 2 or all output phases interrupted • Rated motor power too small in relation to rated inverter power.	• Check connection between inverter and motor • Check startup data and perform new startup, if necessary.

No.	Designation	Response	Possible cause	Measure
84	UL motor protection	Stop with inhibit	Motor utilization too high.	• Check P345/346 I_N-UL monitoring • Reduce load • Extend ramps • Long pause times
94	EEPROM checksum	Immediate switch-off with inhibit	Defective EEPROM	Contact SEW Service.
97	Copy error	Immediate switch-off with inhibit	• Parameter module is removed during copying process • Switching off/on during copying process	Prior to confirming the error: • Load factory setting or complete data set from parameter module

1) No reset required, error message disappears after communication is reestablished

7 Technical Data

7.1 Electronics data for FSC11B communication interface

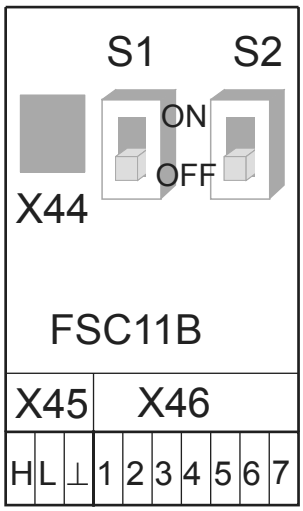
Function	Terminal	Description	Data
System bus (SBus)	X46:1 X46:2 X46:3 X46:4 X46:5 X46:6 X46:7	SC11: SBus high SC12: SBus low GND: Reference potential SC21: SBus high SC22: SBus low GND: Reference potential 24VIO: Auxiliary voltage / external voltage supply[1)]	CAN bus according to CAN specification 2.0, parts A and B, transmission technology according to ISO 11898, max. 64 stations, terminating resistor (120 Ω) can be activated using DIP switches Terminal cross-section: 1.5 mm^2 (AWG15) without conductor end sleeves 1.0 mm^2 (AWG17) with conductor end sleeves
RS-485 interface	X45:H X45:L X45:⊥	ST11: RS-485+ ST12: RS-485– GND: Reference potential	EIA standard, 9.6 kBaud, max. 32 participants Maximum cable length 200 m Dynamic terminating resistor with fixed installation Terminal cross-section: – 1.5 mm^2 (AWG15) without conductor end sleeves – 1.0 mm^2 (AWG17) with conductor end sleeves
Service interface	X44 RJ10		Only for service purposes, exclusively for point-to-point connection Maximum cable length 3 m (10 ft)

1) X46:7 is connected to X12:8 via a connector.

7.2 FSC11B communication module

The FSC11B communication module enables communication with other units. These may include: PC, operator terminals, MOVITRAC® or MOVIDRIVE®.

Part number	1820 716 2
Functions	• Communication with PLC / MOVITRAC® B / MOVIDRIVE® / PC • Operation/parameter setting/service (PC) • The options FSC11B and FIO11B are installed at the same fastening place and therefore cannot be used simultaneously.
Features	• RS-485 (one interface): Plug-in terminals and service interface (RJ10 socket) • CAN-based system bus (SBus) (plug-in terminals) • Supported protocols: MOVILINK® / SBus / RS-485 / CANopen



Function	Terminal	Description	Data
System bus (SBus)	X46:1 X46:2 X46:3 X46:4 X46:5 X46:6 X46:7	SC11: SBus high SC12: SBus low GND: Reference potential SC21: SBus high SC22: SBus low GND: Reference potential 24VIO: Auxiliary voltage / external voltage supply	CAN bus to CAN specification 2.0, parts A and B, transmission technology to ISO 11898, max. 64 participants, terminating resistor (120 Ω) can be activated using DIP switches Terminal cross-section: 1.5 mm^2 (AWG15) without conductor end sleeves 1.0 mm^2 (AWG17) with conductor end sleeves
RS-485 interface	X45:H X45:L X45:⊥	ST11: RS-485+ ST12: RS-485– GND: Reference potential	EIA standard, 9.6 kBaud, max. 32 participants Maximum cable length 200 m Dynamic terminating resistor with fixed installation Terminal cross-section: – 1.5 mm^2 (AWG15) without conductor end sleeves – 1.0 mm^2 (AWG17) with conductor end sleeves
Service interface	X44 RJ10		Only for service purposes, exclusively for point-to-point connection Maximum cable length 3 m (10 ft)

8 Index

C
Cable length, RS-485 12
Cable length, SBus 11
Cable specification, SBus 9

F
Fault memory 24
FSC11B 29
FSC11B communication 29
FSC11B communication front option 29

L
List of errors 25

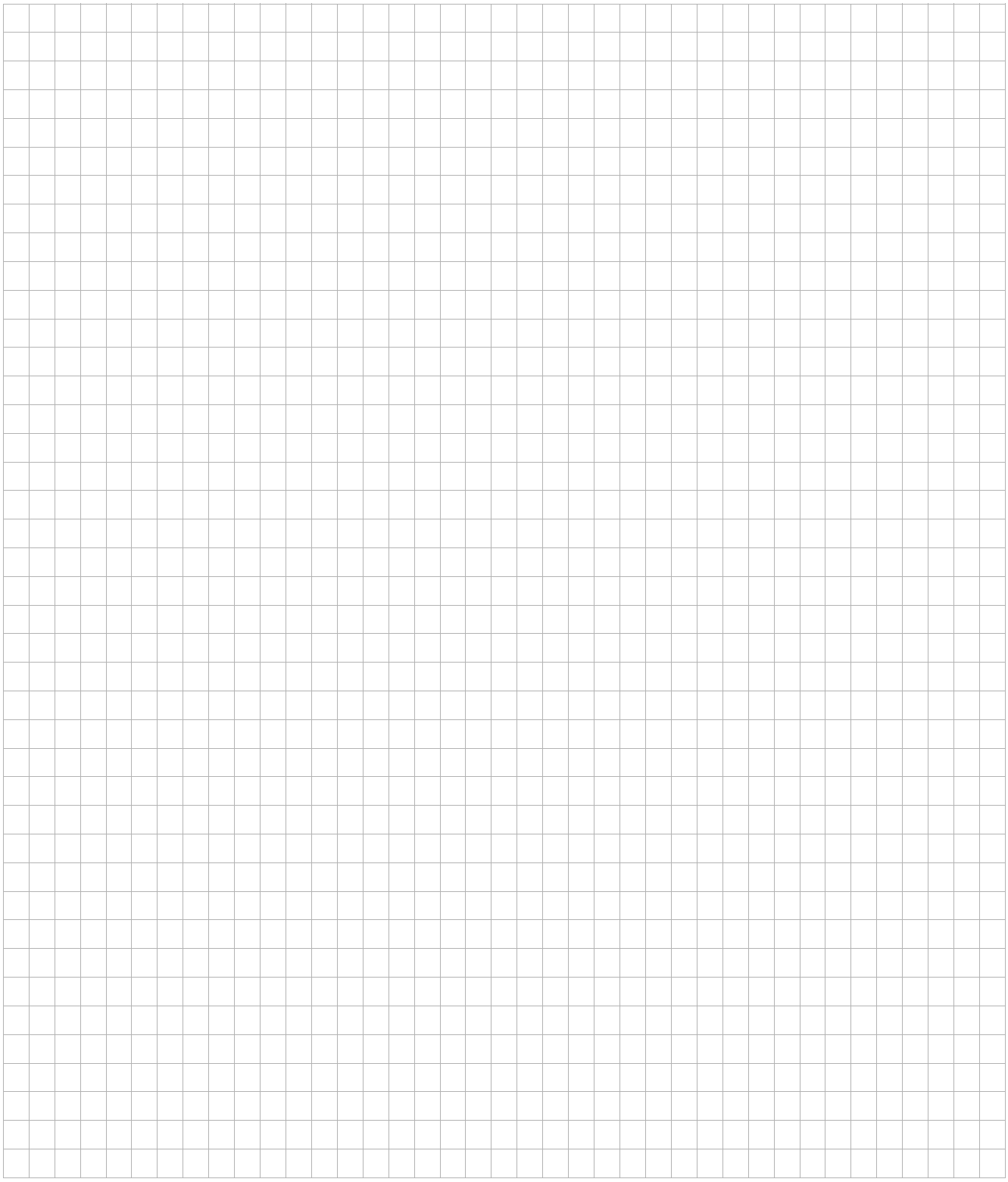
M
MOVITOOLS® MotionStudio 13

P
Parameter list 14
PC startup 13

R
Reset 24
Return codes 23
RS-485, installation 12

S
Safety Notes 5
Startup with PC 13
System bus (SBus), installation 9

U
Unit status codes 23



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